Evidence for inhibition of cholinesterases in insect and mammalian nervous systems by the insect repellent deet

Titre	Evidence for inhibition of cholinesterases in insect and mammalian nervous systems by the insect repellent deet
Type de publication	Article de revue
Auteur	Corbel, Vincent [1], Stankiewicz, Maria [2], Pennetier, Cedric [3], Fournier, Didier [4], Stojan, Jure [5], Girard, Emmanuelle [6], Dimitrov, Mitko [7], Molgo, Jordi [8], Hougard, Jean-Marc [9], Lapied, Bruno [10]
Type	Article scientifique dans une revue à comité de lecture
Année	2009
Langue	Anglais
Date	2009
Pagination	47
Volume	7
Titre de la revue	BMC biology
ISSN	1741-7007
Mots-clés	Animals [11], Binding, Competitive [12], Cholinesterase Inhibitors/metabolism/toxicity [13], Cholinesterases/metabolism [14], Culicidae [15], Data Interpretation, Statistical [16], DEET/metabolism/toxicity [17], Drosophila melanogaster/enzymology [18], Female [19], Humans [20], Insect Proteins/metabolism [21], Insect Repellents/metabolism/toxicity [22], Insecticides/toxicity [23], Kinetics [24], Male [25], Mice [26], Models, Chemical [27], Nervous System/drug effects [28], Neuromuscular Junction/drug effects [29], Neurons/drug effects/physiology [30], Periplaneta/physiology [31], Pesticide Synergists [32], Propoxur/toxicity [33], Sodium Channels/drug effects [34], Synaptic Potentials/drug effects [35]
Résumé en anglais	BACKGROUND: N,N-Diethyl-3-methylbenzamide (deet) remains the gold standard for insect repellents. About 200 million people use it every year and over 8 billion doses have been applied over the past 50 years. Despite the widespread and increased interest in the use of deet in public health programmes, controversies remain concerning both the identification of its target sites at the olfactory system and its mechanism of toxicity in insects, mammals and humans. Here, we investigated the molecular target site for deet and the consequences of its interactions with carbamate insecticides on the cholinergic system. RESULTS: By using toxicological, biochemical and electrophysiological techniques, we show that deet is not simply a behaviour-modifying chemical but that it also inhibits cholinesterase activity, in both insect and mammalian neuronal preparations. Deet is commonly used in combination with insecticides and we show that deet has the capacity to strengthen the toxicity of carbamates, a class of insecticides known to block acetylcholinesterase. CONCLUSION: These findings question the safety of deet, particularly in combination with other chemicals, and they highlight the importance of a multidisciplinary approach to the development of safer insect repellents for use in public health.

URL de la notice	http://okina.univ-angers.fr/publications/ua7531 [36]
DOI	10.1186/1741-7007-7-47 [37]
Lien vers le document	http://dx.doi.org/10.1186/1741-7007-7-47 [37]
Titre abrégé	BMC Biol

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